TM 9-4910-622-14&P

TECHNICAL MANUAL

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT
AND GENERAL SUPPORT MAINTENANCE MANUAL
INCLUDING REPAIR PARTS LIST

FOR

DISTRIBUTOR TESTER, ENGINE
MODEL PDT-5D
(SUN ELECTRIC CORPORATION)
(NSN 4910-00-392-2939)

HEADQUARTERS, DEPARTMENT OF THE ARMY

DECEMBER 1980

WARNING

This equipment detrimental to communications, do not operate within 100 feet of operating communications electronic equipment.

Technical Manual
No. 9-4910-622-14&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, *29 December 1980*

Operator's, Organizational, Direct Support and General Support Maintenance Manual Including Repair Parts List For

DISTRIBUTOR TESTER, ENGINE MODEL PDT-5D (SUN ELECTRIC CORPORATION) (NSN 4910-00-392-2939)

REPORTING OF ERRORS

You can help improve the manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, US Army Armament Materiel Readiness Command, ATTN: DRSAR-MAS, Rock Island, IL 61299. A reply will be furnished to you.

NOTE

This manual is published for the purpose of identifying an authorized commercial manual for the use of the personnel to whom the tester is issued.

Manufactured by: Sun Electric Corporation
3011 East Route 176
Crystal Lake, IL 60014

Procured under Contract No. DAAA09-76-C-6149

This technical manual is an authentication of the manufacturer's commercial literature and does not conform with the format and content specified in AR 310-3, Military Publications. This technical manual does, however, contain available information that is essential to the operation and maintenance of the equipment.

INSTRUCTIONS FOR REQUISITIONING PARTS NOT IDENTIFIED BY NSN

When requisitioning parts not identified by National Stock Number, it is mandatory that the following information be furnished by the supply officer.

1 - Manufacturer's Federal Supply Code Number - 40067

2 - Manufacturer's Part Number exactly as listed herein.

3 - Nomenclature exactly as listed herein, including dimensions, if necessary.

4 - Manufacturer's Model Number - PDT-5D

5 - Manufacturer's Serial Number (End Item)

6 - Any other information such as Type, Frame Number, and Electrical Characteristics, if applicable.

7 - If DD Form 1348 is used, fill in all blocks except 4, 5, 6, and Remarks field in accordance with AR 725-50.

Complete Form as Follows:

(a) In blocks 4, 5, 6, list manufacturer's Federal Supply Code Number followed by a colon and manufacturer's Part Number for the repair part.

(b) Complete Remarks field as follows:

Noun: (nomenclature of repair part)
For: NSN: 4910-00-392-2939
Manufacturer: Sun Electric Corporation

Model: PDT-5D
Serial:

Any other pertinent information such as frame number, type, dimensions, etc.

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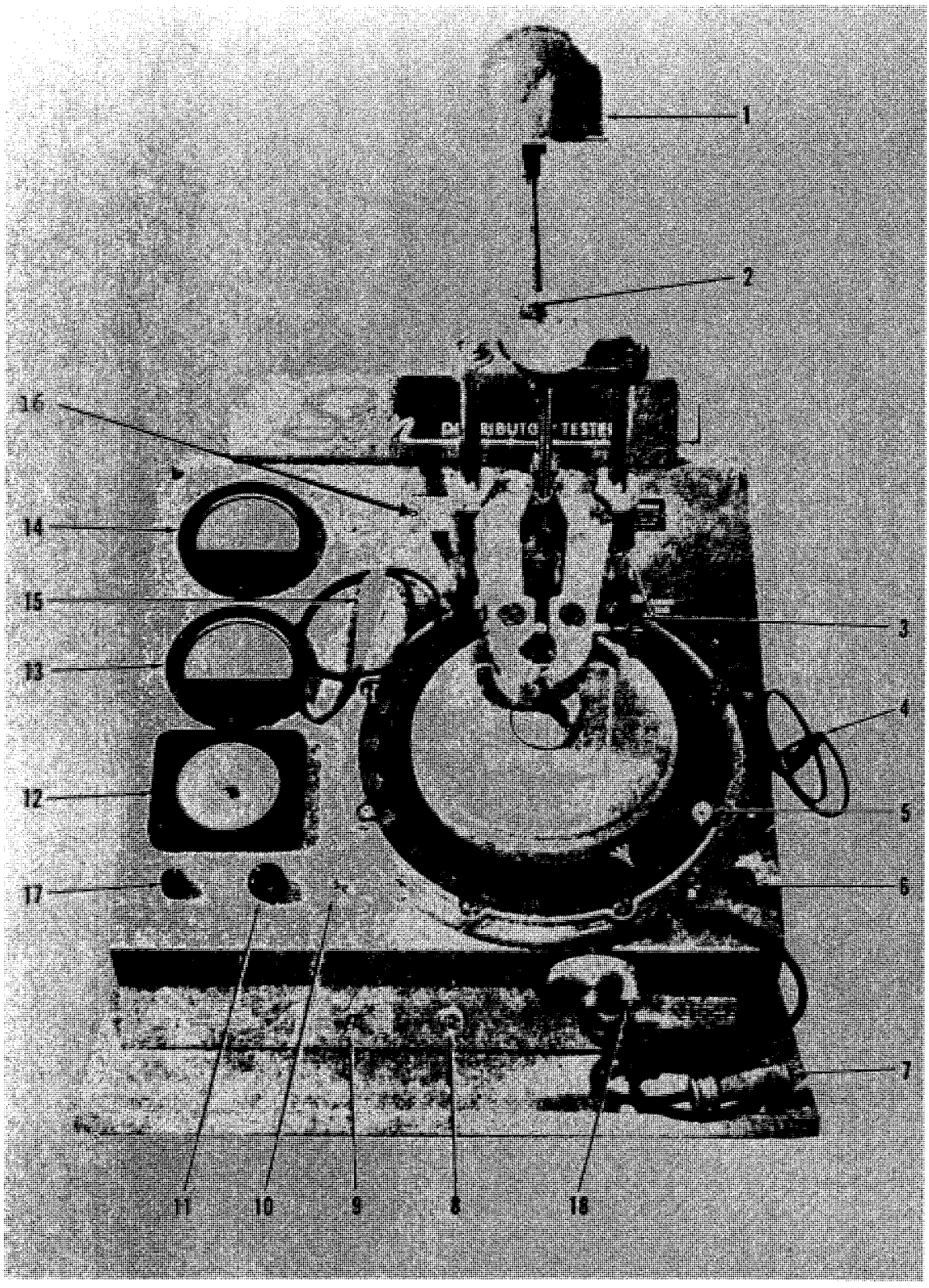


Figure 1. Engine Distributor Tester, Model PDT-5D

PARTS LIST

FIGURE 1. ENGINE DISTRIBUTOR TESTER, MODEL PDT-5D

FIG. AND INDEX NO.	PART NUMBER	DESCRIPTION	REF. SYMBOL	QUANTITY PER TESTER
1-1	848-007	WORK LIGHT		1
-1	910-027	LIGHT BULB (60-WATT)		1
-3	1185	KNOB		1
-4	6002-34	LEAD ASSY (DISTRIBUTOR GROUND)		1
-5	942-2	KNOB,(FOR DEGREE RING)		1
-6	1493-3	KNOB, BAKELITE (13/16" DIA.) VACUUM REGULATOR		1
-7	6006-2	VACUUM HOSE ASSY		1
-8	5675-1	LIGHT, INDICATOR		1
-8	1938-1	LAMP, GLOW (NE-51)		1
-9	689-48	SWITCH, TOGGLE, 3 P3T (MOTOR SWITCH)	SW3	1
-10	689-12	SWITCH, TOGGLE, SPST (RPM)	SW2	1
-11	1492-6	KNOB (1-1/8" DIA.)		1
-12	337-001	GAGE, VACUUM (0-21")	M3	1
-13	767-0118	METER, DWELL (0-50°)	M2	1
-14	767-0117	METER, TACH (0-500, 0-2500 RPM)	M1	1
-15	6002-33	LEAD ASSY (DISTRIBUTOR TERMINAL)		1
-16	1243-504	NAMEPLATE, WARNING		1
-17	1493-3	KNOB, BAKELITE (13/16" DIA.) DWELL METER		1
-18	942-2	KNOB (FOR SPEED CONTROL HAND WHEEL)		1

INTRODUCTION.

This instruction book contains operation and maintenance instructions, and a parts list for the Engine Distributor Tester Model PDT-5D.

The Engine Distributor Tester Model PDT-5D, which will be referred to as the distributor tester in this instruction book is capable of making complete tests on automobile and truck ignition distributors. The condition of 24-, 12-, and 6-volt ignition distributors can be determined.

DESCRIPTION. (See Figure 1.)

The distributor tester consists of a metal cabinet, with a sloping panel containing the distributor mounting clamps, driving mechanism, stroboscopic indicator ring, and associated instruments and controls. The metal cover has two handles and slides over the distributor tester gripping the base with four fasteners. The base of the tester rests on four rubber feet.

An accessory box with a lead hanger on each end is mounted at the top of the cabinet, and the instruction books are in back of the cabinet.

WARNING

The Engine Distributor Tester, Model PDT-5D, is detrimental to communications. DO NOT operate within 100 feet of communications-electronic equipment.

OPERATION.

The electric motor that turns the distributor shaft, and the electrical circuits for the indicating instruments operate on 115-volts, 60 -cycle power. The drive motor turns the chuck and stroboscopic light assembly through a variable speed drive. Speed, vacuum and dwell are indicated on meters, and the advance is indicated on the indicator ring which is graduated in degrees, and is adjustable. The stroboscopic light flashing on the arrow on the moving disc indicates the amount of advance of the distributor. A ground stud is conveniently located on the right hand distributary clamp for attaching the ground lead.

INSTRUMENTS AND CONTROLS. (See Figure 1.)

The names and functions of the instruments and operating controls of the distributor tester are listed in Table 1.

TABLE I

Figure and Index No.	Common Name and Marking	Description and Function
1-12	Vacuum Gage; INCHES VACUUM; 0-21; ZERO ADJUST.	Bourdon tube type gage, with pointer, reading inches of vacuum applied to the distributor vacuum advance mechanism. Set pointer on zero before using by turning ZERO ADJUSTMENT.
1-13	Dwell Meter; DEGREES OF DWELL; 0-50; SET LINE; DISTRIBUTOR RESISTANCE	Pointer type meter with a 0-50 degree scale and a black band indicating electrical circuit resistance in the distributor. The dual function meter indicates breaker point dwell in degrees and normal resistance in the distributor when the pointer reads in the black band. When the pointer reads out of the black band, the resistance is too high.
1-14	RPM Meter; DISTRIBUTOR RPM; 0-500; 0-2500.	Pointer type meter with two scales, reading from zero to 2500 rpm. Indicates the speed of the distributor shaft in revolutions per minute,
1-11	Tach-Dwell Switch; OFF-CAL. -6 CYL. - 8 CYL. -4 CYL.	Black bakelite control knob, with 5 positions: OFF: RPM and DWELL Meters turned off. CAL: In this position the DWELL METER pointer should be set on the SET LINE. 6 CYL: Place in this position for a 6-lobe distributor. 8 CYL: Place in this position for an 8-lobe distributor. 4 CYL: Place in this position for a 4-lobe distributor.

TABLE 1 (cont)

Figure and Index No.	Common Name and Marking	Description and Function
1-17	Dwell Meter Adjustment; DWELL CALIBRATOR	Black bakelite control knob. Turn control to set DWELL METER pointer on SET LINE, when Tach-Dwell switch is in CAL. position.
1-10	Rpm Switch; RPM-500-2500	Two position toggle switch; changes the full scale reading of the DISTRIBUTOR RPM meter to 500 or 2500 rpm.
1-6	Vacuum Control; VACUUM REGULATOR	Black bakelite control knob (multi-turn); Controls the amount of vacuum which is applied to the vacuum advance mechanism on the distributor.
1-9	Master Switch; MOTOR SWITCH-LEFT HAND DRIVE-RIGHT HAND DRIVE	Toggle switch with three positions: OFF: Motor is turned off. LEFT HAND DRIVE: Motor turns the drive chuck in a counterclockwise direction. RIGHT HAND DRIVE: Motor turns the drive chuck in a clockwise direction.
1-18	Speed Control Hand Wheel; HIGH-LOW	Solid wheel with knob in front of panel; increases the speed of the distributor shaft when turned counterclockwise; decreases speed when turned clockwise.
1-5	Degree Indicator Ring	Metal ring calibrated in degrees (in both directions) which is adjustable.
1-3	Distributor Clamp Knob	Black bakelite knob on clamping arms. Tightens and loosens clamping arms on distributor.
1-2	Elevation Hand Wheel; UP-DOWN	Solid wheel with knob, above clamping arms; raises and lowers the clamping arms. Turn clockwise to raise and counterclockwise to lower.
1-8	Indicator Light	Indicates when tester is turned on.
1-7	Vacuum Line	Rubber hose with rubber connector and shut-off clamp; vacuum connection for vacuum advance.
1-15	Distributor Wires	Red clip is positive; black clip is negative. Wires provide electrical power (6 volts approx.) for distributor test.
1-1	Bench Light	Adjustable bench light; illuminates the working area.

DISTRIBUTOR POINT DWELL. (See Figure 2)

Dwell* or dwell angle is the number of degrees the distributor shaft rotates measured from the point where the ignition contacts close to the point where the y open again. Dwell angle is inversely proportional to point gap, that is, increasing the gap decreases the dwell, and vice versa.

Insufficient dwell may cause ignition failure at high speed, while too much dwell increases the total average current which the points must handle, particularly at low speed. This usually leads to very short point life.

After a distributor is initially timed for a given engine, any change indwell will result in a change in timing, requiring re-timing of the distributor since the rubbing block of the moving arm will contact the cam in a different place.

When a dwell specification is given with a high and low limit, set the point dwell to the lower limit for new points to allow for rubbing-block wear.

*

The percent of dwell is the percentage of the actual dwell angle of the points as compared to the maximum, dwell angle possible (100 percent dwell). The 100 percent dwell for 4, 6, and 8 cylinder engines, and some examples of percent of dwell are listed in Table 2.

TABLE 2

		Comparison of percent of dwell and dwell angle		
No. of cylinders	Maximum dwell angle (100% dwell)	Percent of dwell	Calculation	Corresponding dwell angle
4	90°	60%	(. 60) (90°)	54°
6	60°	60%	(. 60) (60°)	36°
8	45°	60%	(. 60) (45°)	27°

CONTACT POINT GAP AND DWELL
(Cam Angle Relationship)

If a distributor cannot be adjusted so that gap and dwell are within specifications at the same time inspect the distributor for the following possibilities:

a. Improper spring tension or sticky pivot.
b. Wrong point set installed.
c. Bent shaft, causing point opening to vary on each cam lobe.
d. Worn cam lobes or defective cam, as above. (Compare gap at each cam lobe if in doubt.)
e. Points floating, or not following the cam at high speeds.
f. Excessive resistance causing false dwell reading,

In practically every case the remedy will be self-evident.

MAINTENANCE OF DISTRIBUTORS.

It is highly recommended that all the functions of a distributor be tested before repair to deter - mine the amount of repair work required and again after repair to make sure that the distributor is in serviceable condition. The test procedure in this instruction book is written to completely test a distributor in logical sequence. The settings of controls are not re-stated in the following test if they are unchanged for that test. For test specifications for a particular distributor see the applicable manufacturer's test data.

ADAPTER FOR TESTING 24 VOLT WATERPROOFED DISTRIBUTORS. (See Figure 3)

An adapter (tachometer connector) is supplied with the distributor tester for making overall distributor tests on
24 volt waterproofed distributors without re-

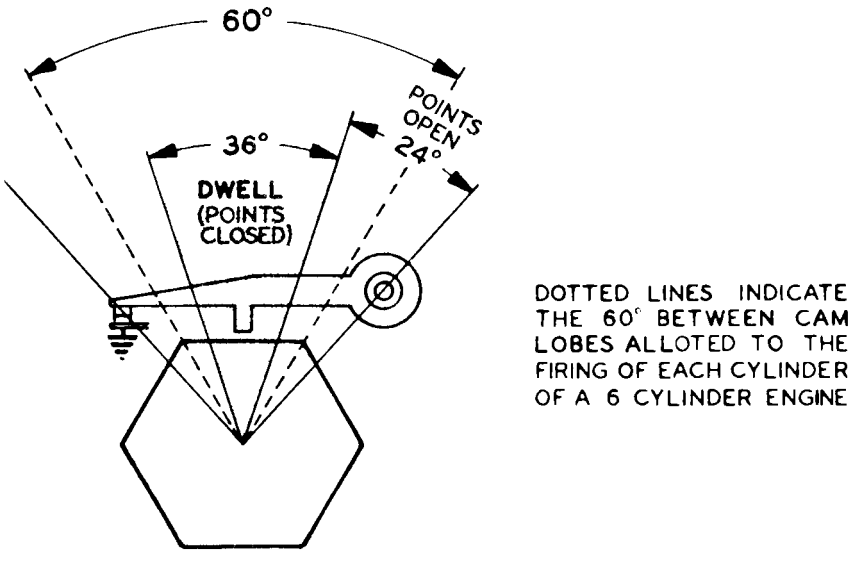

60°
POINTS OPEN
24°
36°
DWELL
(POINTS CLOSED)
DOTTED LINES INDICATE THE 60° BETWEEN CAM LOBES ALLOTED TO THE FIRING OF EACH CYLINDER OF A 6 CYLINDER ENGINE

Figure 2. Dwell Angle for 6-Lobe Cam

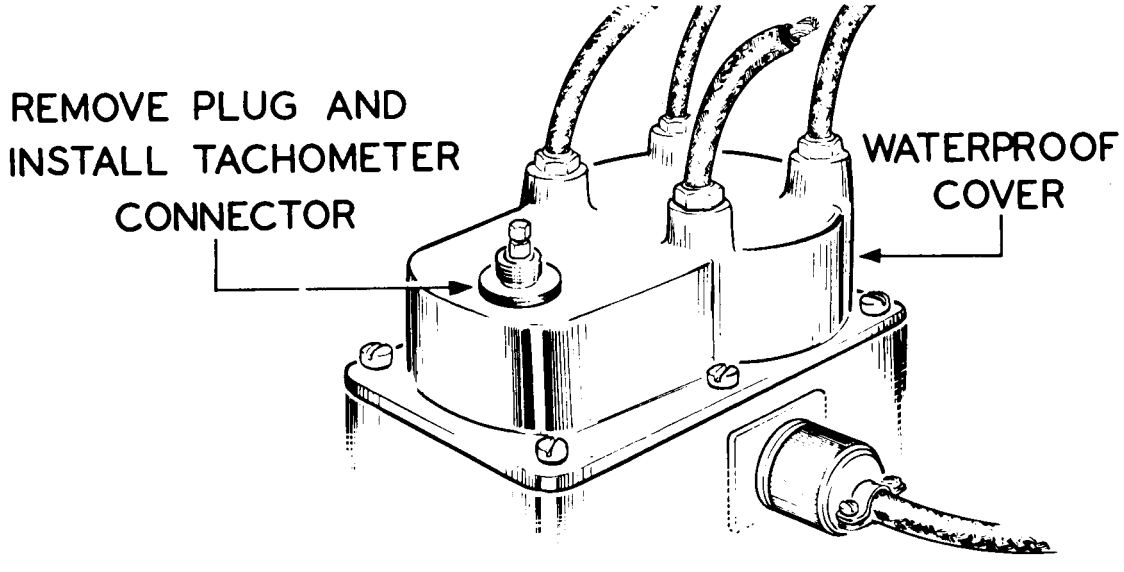


Figure 3. Waterproof Distributor with Tachometer Connector Installed

moving the distributor cover. The waterproof seal under the cover of a good distributor need not be broken for testing the condition of the distributor. (See Figure 11 for adapter)

DISTRIBUTOR VISUAL INSPECTION.

The distributor should be inspected visually before it is installed in the distributor tester. Examine and note the condition of the following:

a. Distributor shaft side clearance and end play.
b. Distributor shaft bearings and bushings for wear and smoothness of operation.
c. Flexible couplings for wear.
d. Breaker plate bearings or bushing for wear, smoothness of operation and lubrication.
e. Cam wick for proper lubrication.
f. Breaker cam for smoothness and lubrication.
g. Insulators, pigtails and flexible internal leads.
h. Contact points for alignment, pitting and burning; and rubbing block wear.
i. Vacuum advance linkage for alignment, wear and binding,

DISTRIBUTOR MOUNTING.

Procedure for mounting the distributor.

a. Using the elevation crank, raise clamp arms high enough to permit shaft of distributor being mounted to clear drive chuck.
b. Position distributor in clamp with vacuum chamber pointing to the right. Tighten clamp arms securely on machined surface of distributor body. If vacuum advance rotates entire distributor install proper adapter. (Four adapters are included in the accessories; see Figure 11).
c. Using the elevation crank, lower the distributor until the drive gear or drive shaft enters the drive chuck. For other types of distributor shafts select one of the four adapters supplied with the unit. Do not bottom the distributor shaft in the drive chuck.
d. Tighten the chuck. For an external adjustment type of distributor, center the drive gear between its upper and lower limits of end play travel before tightening the chuck, Do not try to raise or lower the distributor after the drive chuck has been tightened.

NOTE

Care should be taken when mounting distributors which use a nylon drive gear. To prevent damage to the gear when mounting the shaft into the drive chuck, place a small piece of rubber hose over each one of the three chuck jaws. It is then possible to tighten the chuck without damaging the gear.

DISTRIBUTOR RESISTANCE TEST.

This test indicates the electrical resistance of the distributor primary circuit from the primary terminal, through the points, to the distributor body. Excessive resistance in any portion of the distributor primary circuit will prevent the coil from performing at full efficiency.

Procedure for checking distributor resistance:

a. With MOTOR SWITCH positioned for proper distributor rotation, turn Speed Control for zero rpm (no rotation of distributor shaft) .
b. Clip the distributor and ground test leads of the tester together.
c. Set tach-dwell selector switch to CAL position and adjust calibrator until dwell meter pointer reads on the Set Line, See Figure 4 A.
d. Separate the test leads and connect the distributor lead (red) to the distributor primary terminal, and the ground lead (black) to the ground stud on the clamping arm.
e. With distributor points closed, dwell meter pointer should read within black bar at right end of distributor resistance scale. See Figure 4 B.

(1) If the dwell meter pointer reads in the white area to the left of the black bar, excessive resistance is present in the distributor primary circuit.
(2) To locate the cause of the excessive resistance, move the clip (red) step-by-step through the distributor's electrical circuit from the primary terminal to the ground return. Where the resistance reading on the dwell meter changes considerably from one point to another, correct the high resistance condition.

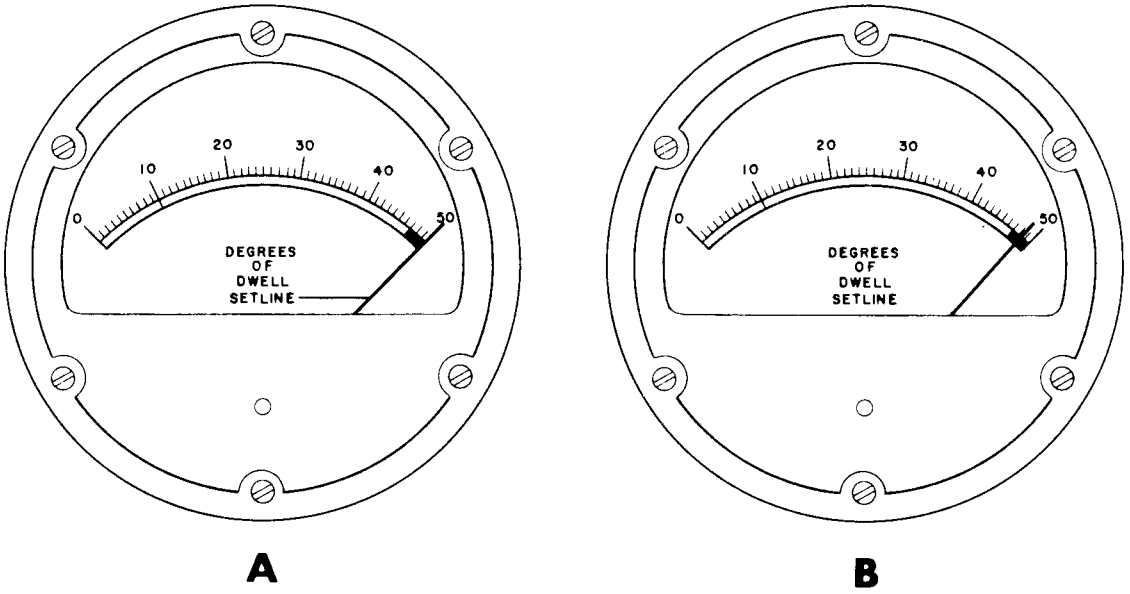


Figure 4. Dwell Meter Resistance Readings

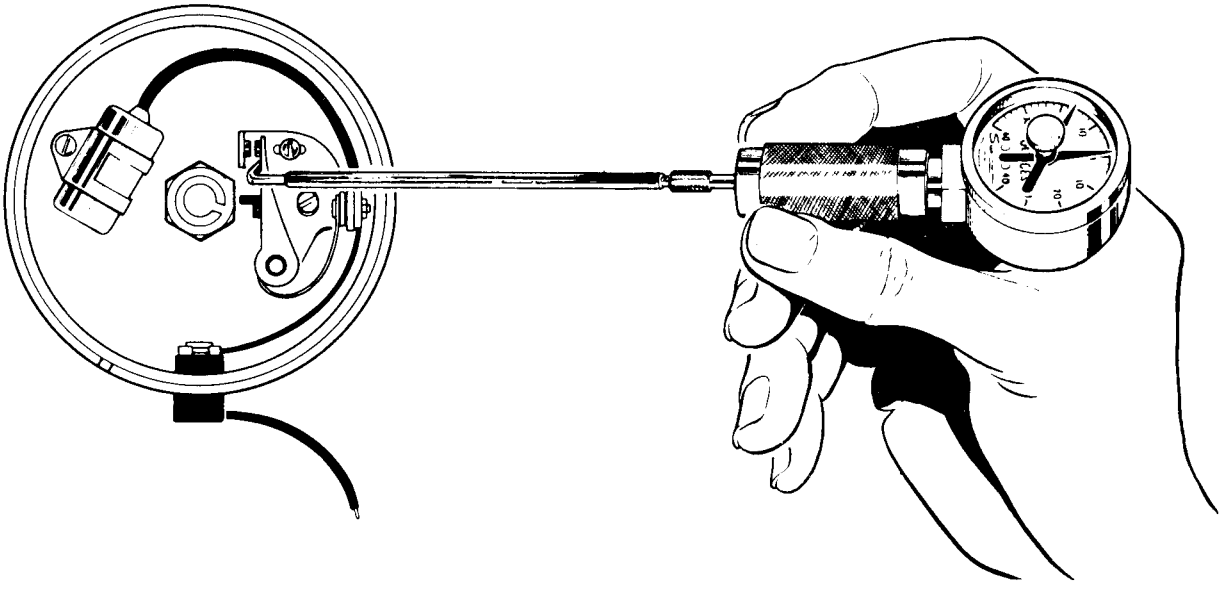


Figure 5. Measuring Breaker Arm Spring Tension

NOTE

On distributors where two sets of breaker points are used test the resistance of each set of points separately by holding or blocking one set open while testing the other set.

BREAKER POINT SPRING TENSION TEST.

Proper tension of the breaker point spring is an important factor in obtaining normal breaker assembly life and maintaining full ignition system efficiency throughout the speed range of the engine. Excessive spring tension can cause rapid rubbing-block, cam, and contact wear while insufficient spring tension may allow the points to bounce at high speeds which generally results in arcing and burning of the points and causes the engine to misfire. (See Figure 5)

Procedure:

a. Turn small knob in center of spring tension scale until the adjustable "riding" pointer engages the pointer of the tension scale and moves it to the zero mark.
b. With dwell meter calibrated and distributor test leads connected to distributor as for distributor resistance test, place hook of tension scale over movable lever near the contact point. (See Figure 5.)

NOTE

Spring tension scale reads in either direction from zero and maybe used to push the point lever-arm when necessary.

c. Slowly pull spring tension tester at right angles to point lever-arm and gradually increase the pull exerted.
d. Watch dwell meter for indication of contact separation by the reading falling to zero.
e. Note reading on tension scale under the ''riding" pointer, Compare reading with distributor test specifications.
f. Hold points open to approximately the recommended gap with the spring tension scale and slowly let them close. If scale reading decreases noticeably from previous reading before the points close, it is probable the pivot requires lubrication

NOTE

On distributors equipped with two sets of breaker points, one set must be held open while testing the other set. A thick piece of clean fiber may be placed between the contacts to hold them open.

BREAKER POINT ALIGNMENT, DWELL, DWELL VARIATION, AND CAM LOBE ACCURACY.

The breaker point alignment is checked as follows :

a. With test leads connected to the distributor (as in the Distributor Resistance Test), turn tach-dwell switch to position which corresponds to type of distributor being tested (4, 8 or 6 cylinder).
b. Place RPM toggle switch in the 2500 rpm position.
c. Adjust distributor speed to 1000 rpm.
d. Observe the slight arc appearing between the breaker points. If the points are properly aligned the arcing will appear in the center of the contacts when viewed from above or from the side.
e. Reduce distributor speed to 200 rpm.

BREAKER POINT DWELL.

Adjust the breaker point dwell as follows: Observe the dwell meter and if necessary adjust the point spacing until the dwell meter indicates the specific degrees of dwell.

(1) On distributors equipped with dual points it will be necessary to adjust the dwell on each set individually. To isolate each set for adjustment, the other set may be blocked open by inserting a clean piece of fiber between the contacts.
(2) See CONTACT POINT GAP AND DWELL paragraph for additional information on point-dwell and point-gap adjustment.

BREAKER POINT DWELL VARIATION.

The breaker point dwell variation is checked as follows :

a. While watching dwell meter, vary the distributor speed from 200 to 1750 rpm. A dwell variation in excess of 2 degrees indicates worn distributor shaft or bushings.

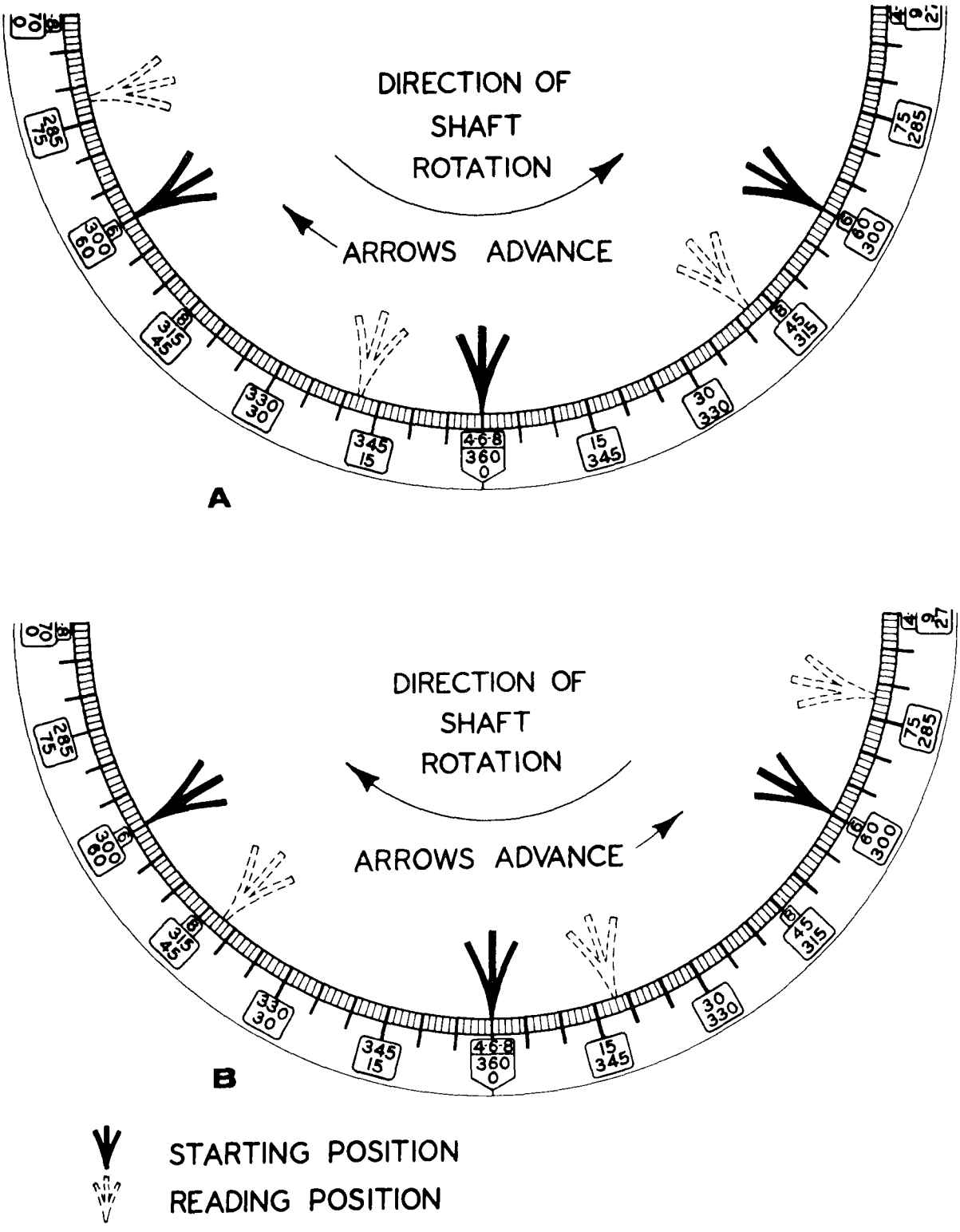


Figure 6. Stroboscopic Arrows Showing Advance

b. Reduce tester speed to 200 rpm.
c. If testing LOADOMATIC type of distributor, turn to the single or dual loadomatic distributors paragraphs for remaining tests.

CAM LOBE ACCURACY. (See Figure 6)

Determine the cam lobe accuracy as follows:
a. Adjust distributor speed to 1000 rpm.
b. Rotate the degree indicator ring on the panel until the zero on the degree ring is aligned with one of the arrow flashes.
c. Observe relative position of all arrow flashes. The arrow flashes should be evenly spaced around the degree ring, within ± 1 degree.
d. The spacing in degrees depends on the number of lobes on the cam.

Cam lobes	Spacing in Degrees
4	90°
6	60°
8	45°

MECHANICAL ADVANCE TEST.

This test is made to determine if the ignition timing conforms to the manufacturer's specified advance curve throughout all speeds of en - gine operation. A defective mechanical advance unit will result in the engine being out of time at certain speeds. This will always result in loss of performance of the engine, and may also cause spark knock and overheating. Figure 6A shows direction of advance f or shaft counter - clockwise rotation; 6B for clockwise rotation.

The procedure for the mechanical advance test is as follows:
a. Set zero of the degree indicator ring in line with the arrow flash nearest the operator.
b. Increase distributor speed, pausing at each specified speed to note if the amount of advance occuring is within ±1° of the specified figure. (The manufacturer may allow more tolerance).
c. Momentarily exceed the highest specified speed given as a check speed. Then, while returning the distributor speed to zero, re-check at each test speed to see that the amount of advance at that speed is the same as it was in step b, and as specified. Any inconsistency in readings requires correction for best engine performance.
(1) If advance is excessive on both steps b and c, the governor weight springs are weak, or the wrong springs are installed.
(2) If advance is slow in step b, and excessive in step c the governor weights are sticking and should be freed-up.
(3) If advance is insufficient both on acceleration and deceleration, the governor spring tension is excessive.
(4) Refer to the specifications for proper service procedure.

VACUUM CHAMBER DIAPHRAGM TEST.

The following procedure is for the usual type of distributor. For LOADOMATIC type distributors see loadomatic distributors paragraphs.

a. Insert proper adapter in the vacuum advance unit and tighten with wrench to insure a good seal.
b. Attach hose to adapter and pinch hose with metal clamp.
c. Adjust vacuum control until the vacuum gage reads 15 inches.
d. Release hose clamp and observe gage. Gage reading will momentarily fall to a lower reading.
(1) If gage reading returns to 15 inches within a few seconds the vacuum chamber is air tight.
(2) If gage reading fails to return to 15 inches the vacuum chamber is leaky.

VACUUM CONTROLLED BREAKER PLATE TEST.

The breaker plate movement must be smooth and even as it rotates or the breaker plate will twist, thereby changing the relationship between the cam and rubbing-block and causing the dwell angle to change. Any change in dwell angle affects the ignition spark, both in quality and timing.

a. Adjust speed control to 1000 rpm.
b. Using the vacuum control knob, adjust the vacuum reading to zero. Then increase vacuum to 20 inches while watching the dwell meter pointer for variations.

c. If dwell reading varies more than 2 degrees (see NOTE below) from 0 to 20 inches of vacuum, it indicates worn breaker plate bushings and bearings or intermittent distributor resistance. Note condition of the distributor wiring. The strands of wire may be broken within the insulation due to flexing.
d. Adjust vacuum control to zero vacuum.

NOTE

This specification applies only to distributors which have centrally located breaker plate bearings.

(On Auto-Lite distributors, Models IAT, IBP and IBR which have side pivoted breaker plates, the dwell will normally vary by more than 2 degrees when the vacuum unit is operated. No definite specifications are given by the manufacturer for the dwell variation of these distributors since the amount of dwell variation varies with the individual distributor depending upon the amount of maximum vacuum advance.)

VACUUM SPARK ADVANCE TEST.

The vacuum spark advance adjusts the spark timing according to the load on the engine to provide peak fuel economy at moderate loads and full power without detonation at heavier loads. In the course of the test look for improper calibration, sticky or erratic breaker plate action, tilting of the breaker plate or interference of the condenser with action of the plate. Refer to Figure 6.

a. Adjust speed control to 1000 rpm.
b. With no vacuum applied to the unit (hose pinched) set the zero of the degree indicator ring in line with one of the arrows.
c. Open hose clip and adjust vacuum control to apply proper amount of vacuum for each specified check point in turn and note the amount of advance obtained. Compare with manufacturer's specifications.
d. Momentarily exceed highest vacuum value specified, then reduce vacuum and again note advance obtained at each specified check point.

(1) If advance is excessive during steps c and d, a weak vacuum advance spring is indicated.
(2) If advance is insufficient during steps c and d, an excessively strong advance spring is indicated.
(3) If advance is insufficient in step c and excessive in step d, or is erratic in both steps c and d, distributor plate is sticking or binding. Refer to manual for proper service procedure.

NOTE

For Delco-Remy breaker plate spring tension test, see next paragraph.

BREAKER PLATE SPRING TENSION TEST FOR DELCO-REMY CENTER-BEARING BREAKER PLATE.

This test is made to determine if the breaker plate is free to rotate as it should under the influence of the vacuum spark control unit. Excessive plate tension may cause sluggish action of the advance mechanism, causing erratic timing under changing loads.

a. Remove the vacuum spark control unit from the distributor. Finger tighten the small screw in the plate to provide an attaching point for the spring tension scale.
b. With the plate adjusted to full retard position (full travel in the direction of cam rotation) hook the spring tension scale on the screw securely and pull, noting the amount of pull necessary to start movement of the breaker plate.

(1) This specification is not over 20 ounces for the type ''A" plate shown, and not over 15 ounces for the type "B" plate.
(2) Tension may be adjusted on type ''A" by adding or removing shim washers to the tension spring on the underside of the plate and on the type ''B", by stretching or replacing the helical plate tension spring.

SINGLE VACUUM CHAMBER LOADOMATIC DISTRIBUTORS.

With the exception of the advance mechanisms, loadomatic distributors are tested in the same manner as described in the preceding pages.

VACUUM CHAMBER DIAPHRAGM TEST.

a. Insert the proper adapter in the vacuum chamber and tighten to insure a good seal.
b. Connect the test leads and place the lobe selector switch in the proper position.
c. Attach hose to vacuum unit and seal hose with metal clamp.
d. Adjust vacuum control until gage reads 5 inches.
e. Release hose clamp and observe gage. Gage will momentarily fall to a lower reading.

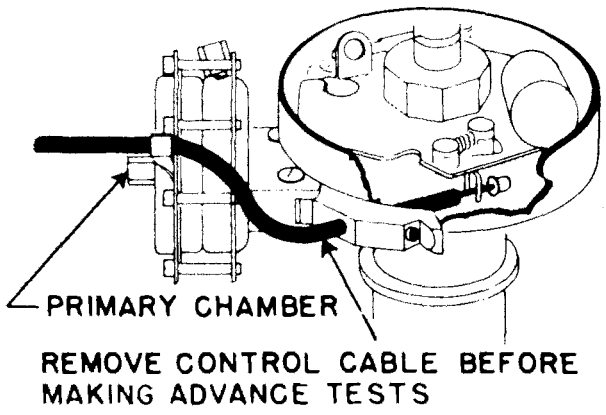
(1) If gage reading returns to 5 inches within a few seconds, vacuum chamber is air tight.
(2) If gage reading fails to return to 5 inches, vacuum chamber is leaky.

BREAKER PLATE TEST.

a. Adjust speed to 1000 rpm.
b. With the vacuum control, increase vacuum from 0 to 5 inches while watching the dwell meter. If the dwell reading varies more than 2 degrees, wear in the breaker plate bushing is indicated.
c. Adjust vacuum and distributor speed for each specified check point in turn and note the amount of advance obtained.
d. Reduce vacuum and distributor speed and again note advance obtained at each specified check point. Consult service manual for specific adjusting procedures.

DUAL VACUUM CHAMBER LOADOMATIC DISTRIBUTORS.

There are two types of dual vacuum chamber LOADOMATIC distributors; an early type used only on Lincoln in 1953 (see figure 7), and a later type used more recently on Ford, Lincoln and Mercury products (see figure 8). With the exception of the advance mechanisms, LOADOMATIC distributors are tested in the same manner as described in the preceding pages. If a 1953 Lincoln distributor is being tested the control cable on the distributor should be removed.



VACUUM CHAMBER DIAPHRAGM TEST

Figure 7

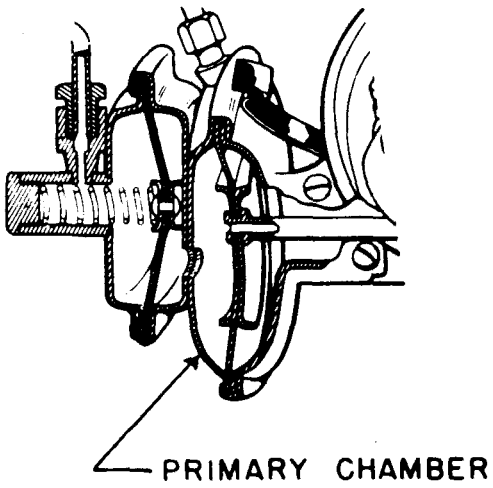


Figure 8

VACUUM CHAMBER DIAPHRAGM TEST.

a. Insert the proper adapter in the primary vacuum chamber and tighten to insure a good seal.
b. Leave test leads connected and the lobe selector switch in the proper position as before.
c. Attach hose to vacuum unit and seal hose with metal clamp.
d. Adjust vacuum control until gage reads 7 inches for 1953 models or 20 inches for later models.
e. Release hose clamp and observe gage. Gage will momentarily fall to a lower reading.

(1) If gage reading returns to original reading within a few seconds, vacuum chamber is air tight.
(2) If gage reading fails to return to original reading, chamber is leaky.

BREAKER PLATE TEST.

a. Adjust speed to 1000 rpm.
b. With the vacuum control, increase vacuurn from 0 to 7 inches while watching dwell meter. If the dwell meter reading varies more than 2 degrees, wear in the breaker plate bushing is indicated.

ADVANCE TEST.

a. Adjust vacuum control until gage reads zero, then disconnect hose,
b. With distributor operating at minimum rpm place degree ring zero in line with one of the arrow flashes.
c. Adjust vacuum and distributor speed for each specified check point in turn and note the amount of advance obtained.
d. Reduce vacuum and distributor speed and again note advance obtained at each specified check point. Consult service manual for specific adjusting procedures.

TRANSMISSION AND OVER-DRIVE GOVERNOR TEST.

Test the transmission and overdrive governor as follows :

a. Place governor drive adapter in the distributor tester drive chuck and tighten.
b. Place governor in clamp and tighten securely.
c. Adjust the elevating control so governor shaft fits into slot in drive adapter.
d. Connect distributor lead to contact terminal on governor and ground lead to governor body.

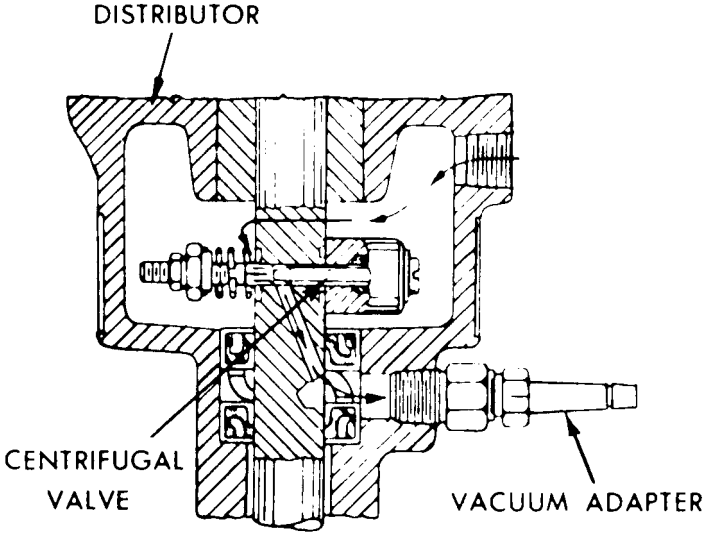


Figure 9. Delco-Remy Governor Cross-section

e. Turn motor drive switch to right or left hand rotation, as indicated by the specifications for the governor being tested.
f. Turn selector switch to 8 cylinder position.
g. Use dwell meter to indicate "make" and "break" on acceleration and deceleration against the manufacturer's specifications for the governor being tested.

DELCO-REMY AND HOLLEY GOVERNOR TESTS.

DELCO-REMY GOVERNOR TEST. (Figure 9)

a. With distributor mounted in tester, insert proper vacuum adapter in lower fitting on distributor housing and tighten with wrench to insure a good seal.
b. Set MOTOR SWITCH to proper direction of rotation and adjust speed to zero rpm.
c. Attach hose to vacuum adapter and seal hose with metal clamp.
d. Adjust vacuum control until gage reads 5 inches.
e. Release hose clamp, increase distributor speed until vacuum gage reading reaches a maximum value. This maximum value will vary, depending on the type of centrifugal valve parts used,
f. After this maximum reading has been reached, slowly decrease the distributor speed until the vacuum gage falls 0.1 inch from its maximum reading. The speed at which this 0.1 inch vacuum drop occurs will be the no load governed speed.

NOTE

Distributor rpm is one-half engine rpm. If factory recommendations call for 3600 rpm no-load governed speed, this would be 1800 rpm on the tester and the governor should be adjusted so that valve will close at this speed. Repeat test after each adjustment.

HOLLEY GOVERNOR TEST. (Figure 10)

a. With distributor mounted in tester insert proper vacuum adapter in lower fitting on distributor housing and tighten with wrench to insure a good seal.
b. Set MOTOR SWITCH to proper direction of rotation and adjust speed to zero rpm.
c. Attach hose to vacuum adapter and seal hose with metal clamp.
d. Adjust vacuum regulator until gage reads 4.5 inches.
e. Release hose clamp. Vacuum reading should now be approximately 2 inches.
f. Adjust distributor speed to a point well above the desired governing rpm. At this speed the vacuum gage should again read the pre-determined setting of 4.5 inches.
g. Slowly decrease the distributor speed while observing the vacuum gage. The speed at which the gage reading begins to fall will be the no-load governed speed.

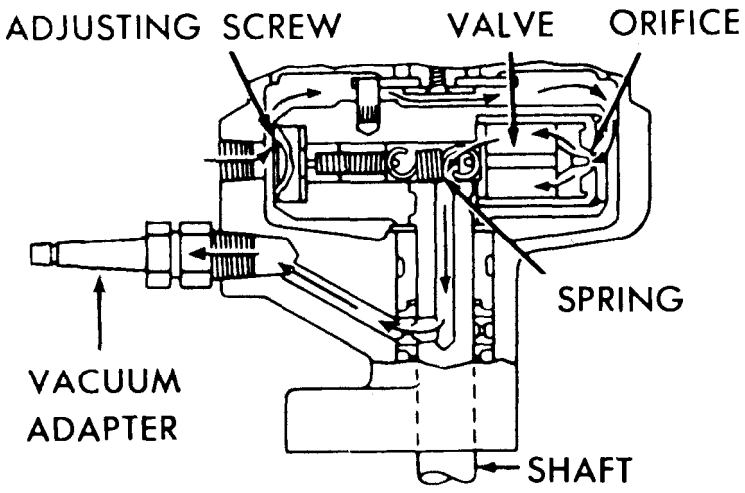


Figure 10. Holley Governor Cross -section

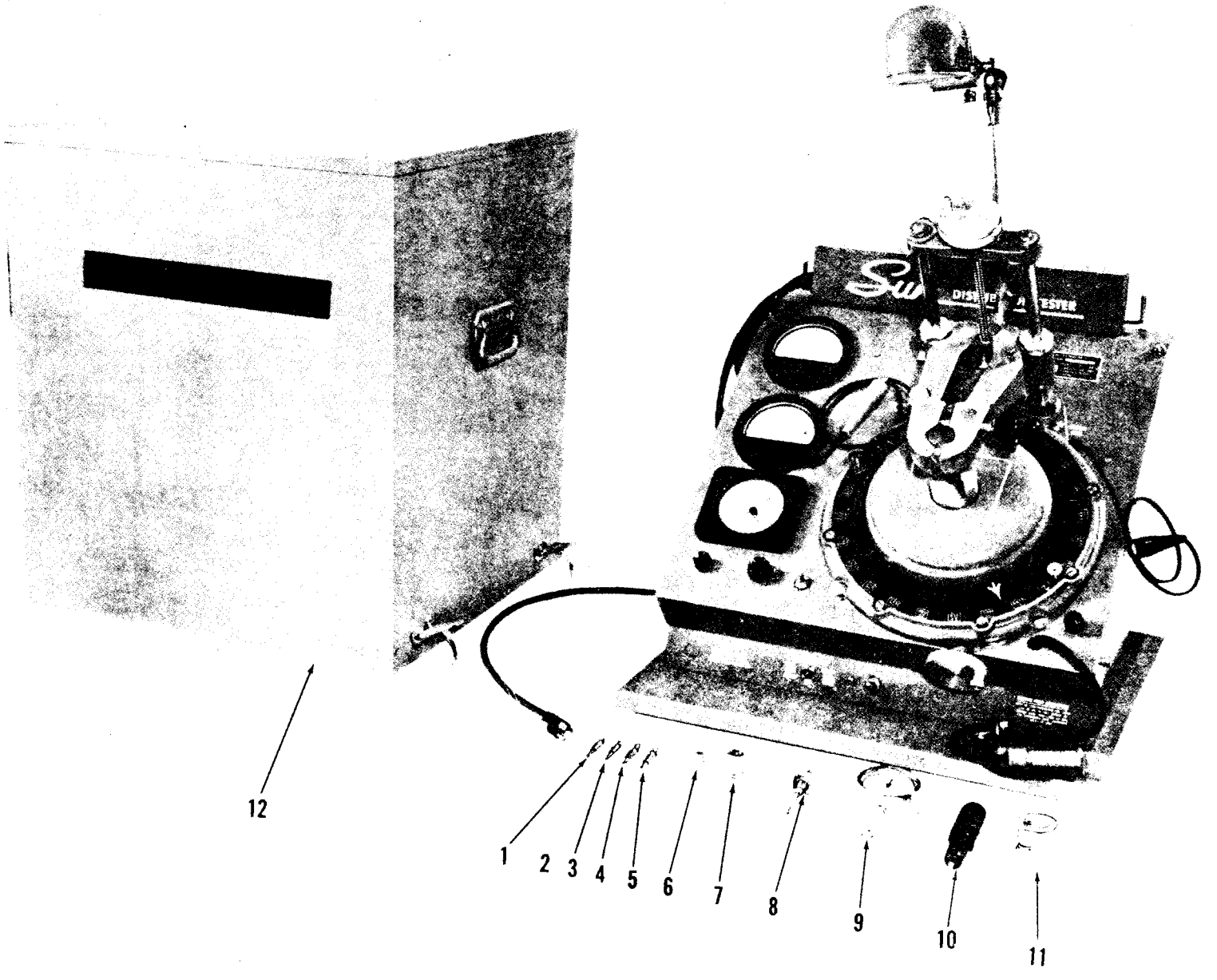


Figure 11. Engine Distributor Tester, Model PDT-5D, Accessories

LIST OF ACCESSORIES
FOR PDT 5D

FIG. 11 INDEX NO.	QTY	PART NUMBER	COMPONENTS & SUB ASSEMBLIES
	1	671-712	VACUUM FITTINGS
1			115-1 1 VAC. FTG. 1/8" N.P.T.
3			115-2 1 VAC. FTG. 7/16"-24
4			115-3 1 VAC. FTG. 3/8"-24
5			115-4 1 VAC. FTG. 5/16"-24
6			823-1 1 ADAPTER BUSHING 1/4-1/8 N.P.T.
9	1	334-101	SPRING TENSION GAUGE
11	1	1700-A	COLLET (CHEVROLET)
			675-57 1 SCREW
			1700 1 COLLET
			1701 1 BRACKET
			400-20 1 WASHER
			409-18 1 NUT
8	1	2546-003	ADAPTER, PRIMARY CIRCUIT
7	1	3127-2	ADAPTER (STUDEBAKER & CADILLAC 51 & 52)
			INTERNATIONAL & CORVAIR & RENAULTS
10	1	1336	CHUCK WRENCH
	3	669-519	TUBING, INSUL. (FOR CHUCK JAWS)
12	1	7009-044	COVER

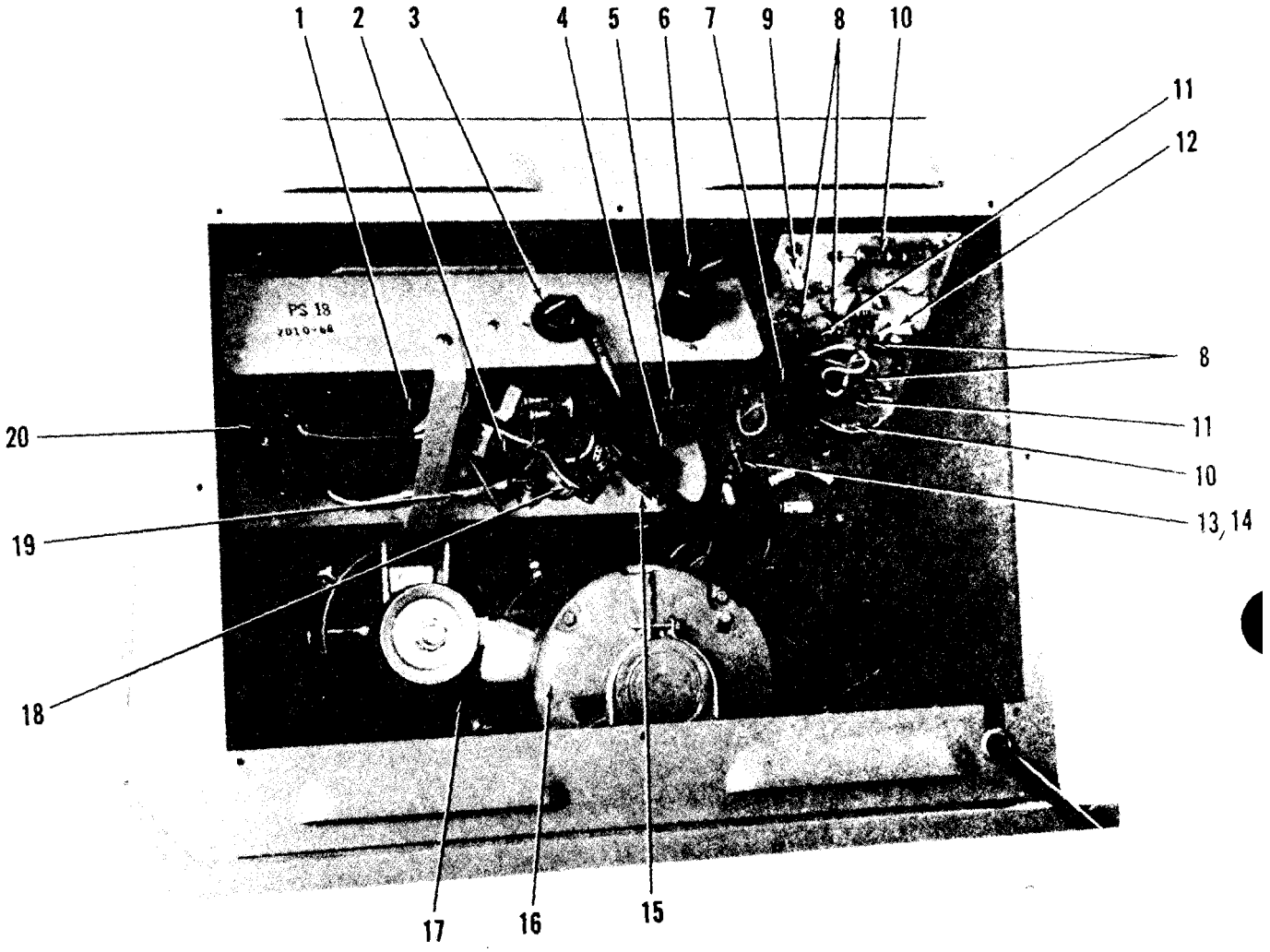


Figure 12. Interior Components

PARTS LIST
FIGURE 12. INTERIOR COMPONENTS

FIG. AND INDEX NO.	PART NUMBER	DESCRIPTION	REF. SYMBOL	QUANTITY PER TESTER
12-1	778-8	REACTOR, 10H, 500 OHMS DC RESISTANCE	L1	1
-2	774-203	RECTIFIER ASSY, METALLIC	CR1, CR2	1
-3	1020-5	CONNECTOR, PLUG, ELECTRICAL, 5-CONTACT, M	P3	1
-4	825-3	CONNECTOR, RECEPTACLE, ELECTRICAL, 2-CONTACT, M (ON POWER SUPPLY CHASSIS)	P1	1
-5	679-161	CAPACITOR, FIXED, ELECTROLYTIC, 6000 UF, 15 VDC	C6	1
-6	825-3	CONNECTOR, PLUG, ELECTRICAL, 2-PRONG, M (CABLE FOR XFMR2)	P2	1
-7	778-193	TRANFORMER, POWER	XFMR2	1
-8	771-215	SEMICONDUCTOR DEVICE, DIODE	CR3, CR4, CR7, CR8	4
-9	685-108	RESISTOR, VARIABLE 0-1000 OHMS, 1/2W	R9	1
-10	679-462	CAPACITOR, FIXED, ELECTROLYTIC, 640 UF, 6.4 VDC	C11, C12	2
-11	679-212	CAPACITOR, FIXED, ELECTROLYTIC, 50 UF, 50 VDC	C9, C10	2
-12	484-2	REACTOR, 12 MILLIHENRIES	L2, L3	2
-13	685-111	RESISTOR ASSEMBLY, 0-600 OHMS, R10	R10	1
-14	685-111	RESISTOR ASSEMBLY, 0-3000 OHMS, R15	R15	1
-15	825-4	CONNECTOR, PLUG, ELECTRICAL 2-CONTACT, F (INCLUDES SHELL)	J1	1
-16	502-032	MOTOR, AC, 1/4 HP, 1725 RPM, 115 VAC	MOT	1
-17	658-2	BELT, "V"		1
-18	763-4	CONNECTOR, RECEPTACLE, ELECTRICAL, 8-CONTACT (ON POWER SUPPLY CHASSIS)	J4	1
-19	774-115	SEMICONDUCTOR DEVICE, DIODE, HV	CR11	1
	684-226	RESISTOR, FIXED, WIRE WOUND, 2500, 5W	R2	1
	684-87	RESISTOR, FIXED, WIRE WOUND, 5 OHMS, 5W	R3	1
-20	778-128	TRANSFORMER, POWER	XFMR1	1

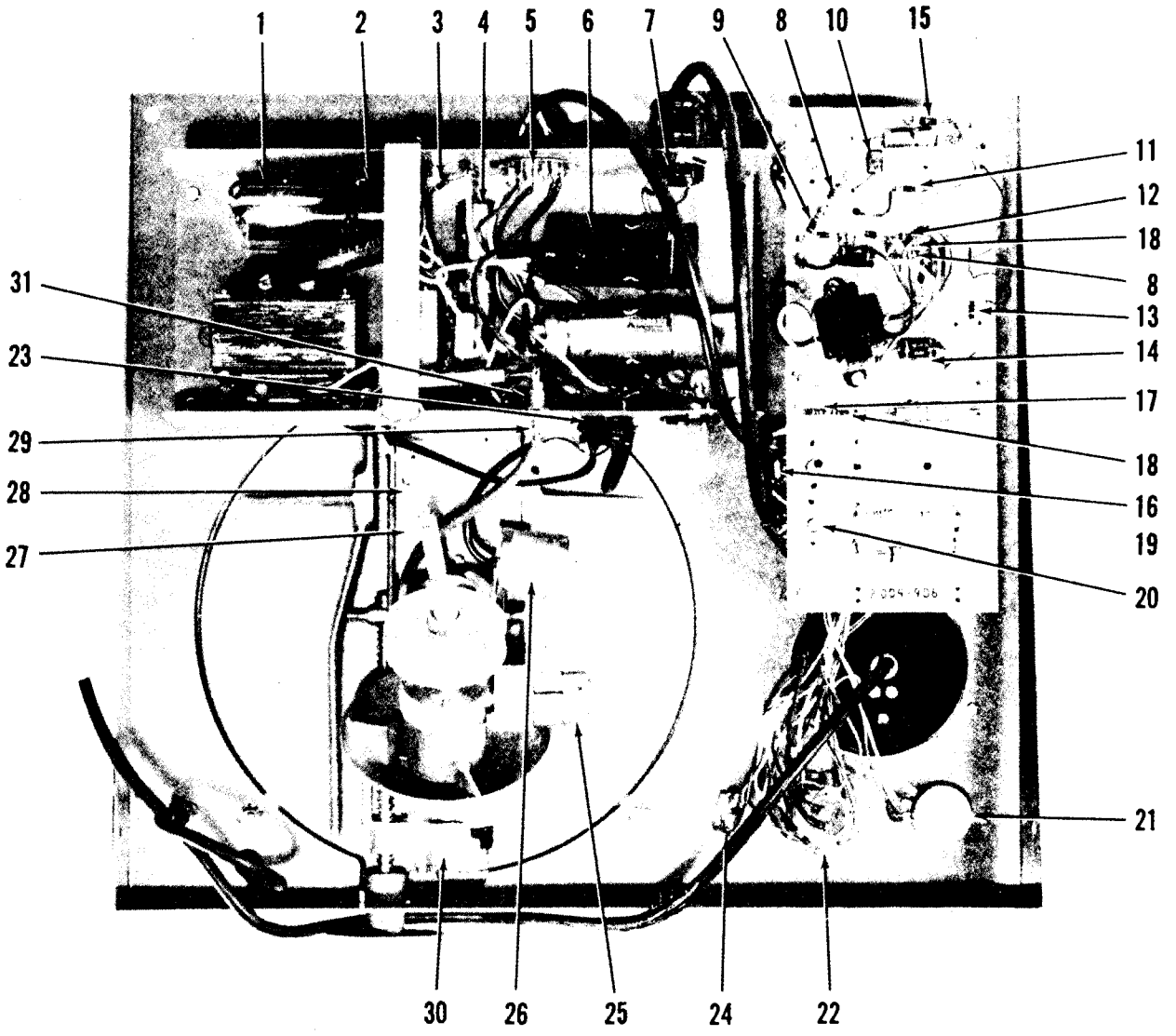


Figure 13. Interior Components

PARTS LIST

Fig. and Index No.	Part Number	Description	Ref. Symbol	Quantity Per Tester
13-1	859-4	ELECTRON TUBE, 5U4-GB	VT1	1
-2	763-4	SOCKET, ELECTRON TUBE, octal		1
-3	680-95	RESISTOR, FIXED, COMPOSITION, 47 ohms, l/2W, 10%	R1	1
-4	679-79	CAPACITOR, FIXED, ELECTROLYTIC, 10 UF, 600 VDC	C5	1
-5	763-1	SOCKET, 5-contact wafer, F (on power supply chassis)	J3	1
-6	778-129	TRANSFORMER, PULSE	XFMR3	1
-7	825-15	CONNECTOR, RECEPTACLE, ELECTRICAL, 2-contact, F (on power supply chassis)	J2	1

PARTS LIST (CONT)
FIGURE 13

FIG. A INDEX	PART NUMBER	DESCRIPTION	REF. SYMBOL	QUANTITY PER TESTER
-8	680-3	RESISTOR, FIXED, COMPOSITION, 150 OHMS, 1/2W, 10%	R5, R11	2
-9	680-6	RESISTOR, FIXED, COMPOSITION, 100 OHMS, 1/2W, 10%	R7	1
-10	774-103	SEMICONDUCTOR DEVICE, DIODE	CR10	1
-11	771-215	SEMICONDUCTOR DEVICE, DIODE	CR9	1
-12	680-106	RESISTOR, FIXED, COMPOSITION, 330 OHMS, 1/2W, 10%	R6	1
-13	680-142	RESISTOR, FIXED, COMPOSITION, 560 OHMS, 1/2W, 10%	R14	1
-14	680-65	RESISTOR, FIXED, COMPOSITION, 3.9K, 1/2W, 5%	R18	1
-15	680-9	RESISTOR, FIXED, COMPOSITION, 300 OHMS, 1/2W, 5%	R12	1
-16	680-113	RESISTOR, FIXED, COMPOSITION, 3.3K OHMS, 1/2W, 10%	R19	1
-17	680-67	RESISTOR, FIXED, COMPOSITION, 680 OHMS, 1/2W, 5%	R4	1
-18	772-104	SEMICONDUCTOR DEVICE, DIODE (ZENER DIODE)	CR5, CR6	2
-19	685-104	RESISTOR, VARIABLE, 0-600 OHMS, 1/2W	R8	1
-20		CAPACITOR, FIXED, PAPER DIELECTRIC, 200 VDC, PADDING FOR C7 AND C8 (CAPACITY AS REQ'D)		AS REQ'D
-21	685-59	RESISTOR, VARIABLE, 0-300 OHMS, 1W (DWELL CALIBRATION)	R13	1
-22	762-58	SWITCH, ROTARY, 3-SECTION, W/AC SWITCH (TACH-DWELL SWITCH)	SW1	1
-23	1028-1	CONNECTOR, PLUG, ELECTRICAL, 8-CONTACT	D4	1
-24	689-12	SWITCH, TOGGLE, SPST (RPM)	SW2	1
-25	120-135	REPLACEMENT KIT, VACUUM PUMP ASSY		1
-26	1340-3	RELAY, CAM OPERATED	REL1	1
-27	2-2025	SWITCH CONTACT AND CAPACITOR ASSY, FIXED, PAPER DIELECTRIC, 0.25 UF, 600 VDC	C1, C2, C3, SW4	1
-28	676-71	CONNECTOR, FASTON	J5	1
-29	1040-2	CONNECTOR, PLUG, ELECTRICAL, RED, 1-CONTACT (MALE PIN JACK)	P6	1
-30	106-503	IDLER FORK AND SWITCH ASSY (WITH CONTACT ARM FOR SW4)		1
-31	1041-2	CONNECTOR, RECEPTACLE, ELECTRICAL, RED, 1-CONTACT (FEMALE PIN JACK)	J6	1

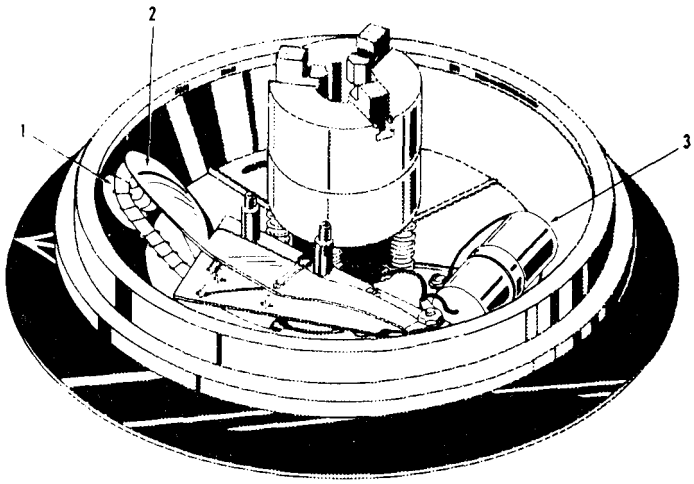


Figure 14. Flash Tube Assembly

PARTS LIST
Figure 14. Flash Tube Assembly

Fig. and Index No.	Part Number	Description	Ref. Symbol	Quantity Per Tester
14-1	1045-4	FLASHTUBE		1
-2	1045-0501	FLASHTUBE AND CONTACT ASSY (on bakelite base)		1
-3	679-177	CAPACITOR, FIXED, PAPER DIELECTRIC, 0.25 UF, 600 VDC		

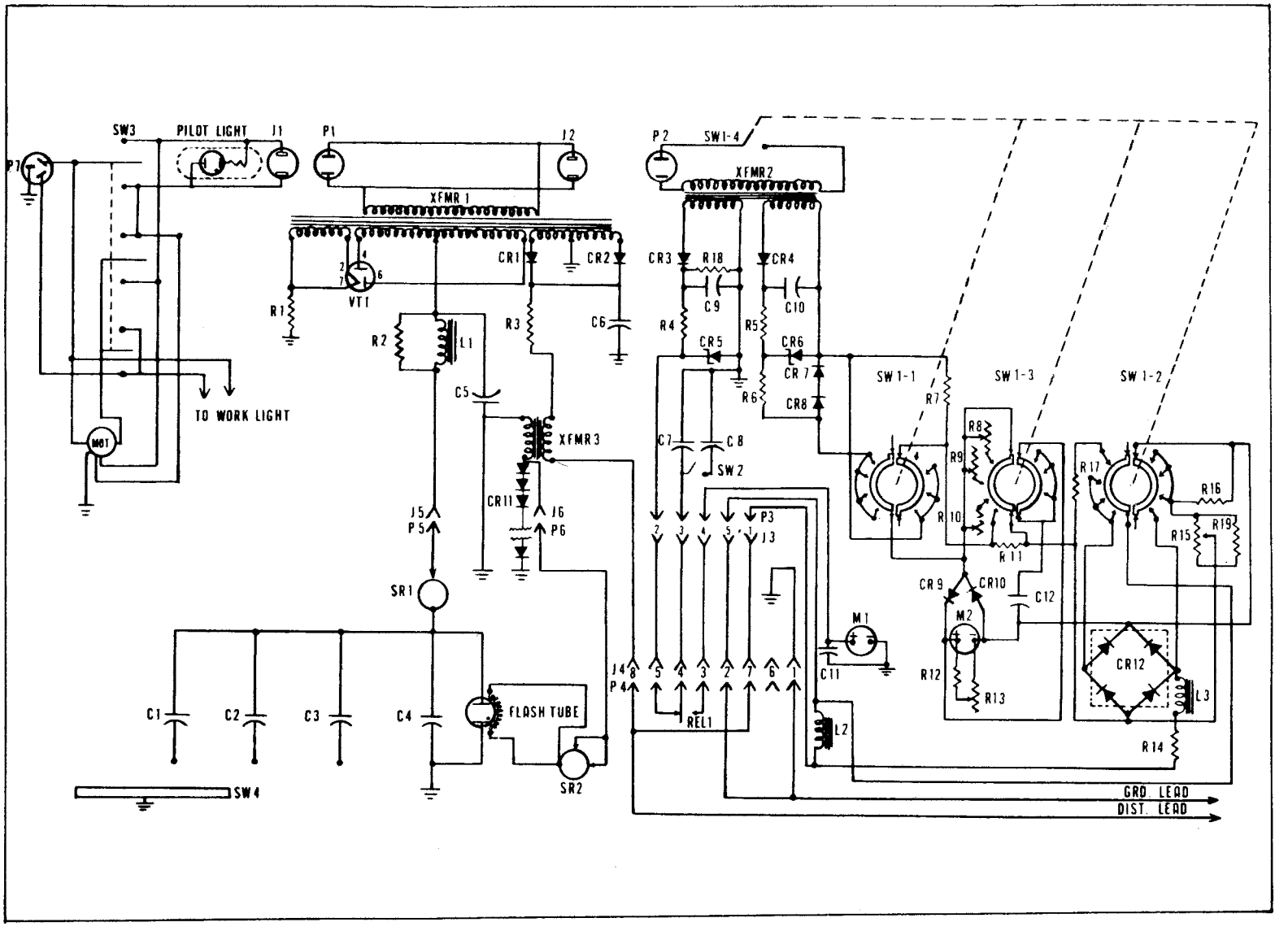


Figure 15. Electrical Wiring Diagram For PDT-5D

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